Washington State Department of Transportation

Vancouver HOV Lane Monitoring and Evaluation Report

December 2001

Executive Summary

PROJECT DESCRIPTION

On October 29, 2001, a new High Occupancy Vehicle (HOV) lane opened on Interstate 5 (I-5) between 99th Street and Mill Plain Boulevard in Vancouver. The lane is reserved for vehicles with two or more passengers (carpools, vanpools and buses) as well as motorcycles. The lane opened in conjunction with the substantial completion of the I-5 widening project in Vancouver. The hours of operation are from 6 to 9 a.m. during the weekday morning commute. The lane is open to all traffic at all other times.

As congestion continues to grow in Southwest Washington, the community has asked WSDOT to find ways to maximize the capacity of existing freeways. Through an extensive planning and public involvement effort led by the Southwest Washington Regional Transportation Council (RTC), an HOV lane was identified as an affordable and efficient way to keeping people moving on I-5 now and in the future.

The Vancouver HOV Lane is the initial phase of a bi-state plan that includes a southbound lane in Oregon during the morning commute. Future extension would be in conjunction with the I-5 widening in Delta Park and additional river-crossing capacity that are currently under discussion.

The following organizations are partners on the Vancouver HOV Lane Project:

- Washington State Department of Transportation (WSDOT)
- Southwest Washington Regional Transportation Council (RTC)
- C-TRAN
- City of Vancouver
- Clark County
- Washington State Patrol (WSP)
- Oregon Department of Transportation (ODOT)
- Metro
- Tri-Met

OUR COMMITMENT TO MONITORING AND EVALUATION

The Vancouver HOV Lane is a pilot project and will be monitored and evaluated on an ongoing basis according to established traffic engineering standards and specific success indicators such as usage, travel time, violation rates and public opinion.

Because this information will be the basis for determining whether or not the Vancouver HOV Lane is a success, WSDOT and its partners are committed to collecting accurate and sufficient

data on which to base such an important decision. As the state agency charged with building, maintaining, operating and promoting safe and coordinated transportation systems, WSDOT believes this to be a necessary and responsible action on our part.

Operational decisions regarding the Vancouver HOV Lane will be made by WSDOT and the RTC Board of Directors based on information collected throughout the Vancouver HOV Lane test period.

REPORT HIGHLIGHTS

The following are highlights from the *Evaluation Report #1,* the first of four evaluation reports that will be generated during the Vancouver HOV Lane test period.

Evaluation Report #1

Evaluation Report #1 presents baseline information (collected prior to the opening of the Vancouver HOV Lane) and the results of the first post-opening collection of data in November and December. Additional evaluation reports will be generated approximately every three months during the Vancouver HOV Lane test period. The detailed baseline information was collected in May and September 2001 and is available in the *Baseline Conditions Report*.

The following is an overview of results contained in the Evaluation Report #1:

Usage

GOAL: To move more people in the HOV lane during the AM peak period than in either of the adjacent general-purpose lanes.

- The Vancouver HOV Lane is moving **2,336** persons during the three-hour peak period from 6 a.m. to 9 a.m.
- The two adjacent general-purpose lanes are moving **4,256** persons each for a total of 8,512 persons during the three-hour peak period from 6 a.m. to 9 a.m.
- The Vancouver HOV Lane is moving **979** persons during the peak hour from 7 a.m. to 8 a.m.
- The two adjacent general-purpose lanes are moving **1,295** persons each for a total of 2,590 persons during the peak hour from 7 a.m. to 8 a.m.

Persons Per Lane (Table 2 in Evaluation Report #1)

Measure	Baseline (September 2001)	After HOV Opening (November 2001)	
	All Lanes	HOV Lane	GP Lanes (each)
3-Hour Count (6-9 am)	3,361	2,336	4,256
Peak Hour Count (7-8 am)	1,193	979	1,295

Measured at 33rd Street for the three through traffic lanes.

Travel Time

GOAL: To reduce peak period travel time for HOV lane users and reduce the average per-person travel time for all users.

- Prior to the opening of the lane, travel time for all users of this segment of I-5 (from 99th Street to the south end of the Interstate Bridge) averaged **9.6** minutes during the three-hour peak period from 6 a.m. to 9 a.m.
- After the opening of the lane, travel time for users in the general-purpose lanes averaged **8.4** minutes during the three-hour peak period from 6 a.m. to 9 a.m.
- Travel time for users of the HOV lane averaged **6.8** minutes during the three-hour peak period from 6 a.m. to 9 a.m.

Three-Hour Travel Time Results for HOV and General Purpose Users
99th Street to Interstate Bridge (Table 8 in Evalutation Report #1)

Average Travel Time in Minutes per Vehicle

I-5 Segment	Baseline Travel Time – All Users	Travel Time After HOV Opening		Travel Time Change from Baseline		HOV Travel Time compared to GP Lanes*
		General Purpose Lanes	HOV Lane	General Purpose Lanes	HOV Lane	
99th Street to SR-500	4.5	3.7	3.3	-0.8	-0.8	-0.4
SR-500 to Mill Plain	1.6	2.2	1.2	+0.6	-0.4	-1.0
Mill Plain to Interstate Bridge (south end)	3.5	2.5	2.3	-1.0	-1.2	-0.2
TOTAL	***9.6***	***8.4***	***6.8***	***-1.2***	***-2.8***	***-1.6***

Travel time runs over at least three different days in September 2001 and November-December 2001
*A negative number indicates the HOV lane is saving time compared to the GP lanes.

Although data collected over the three days in November and the one day in December indicate travel time savings for both HOV lane users and general-purpose lane users, WSDOT received telephone calls and e-mails that reported an increase in morning commute time for general-purpose lane users traveling this segment of I-5. In response, WSDOT isolated and reviewed the data for the peak *hour* of operation (from 7 a.m. to 8 a.m.) in addition to the travel times averaged over the full three-hour peak period. Those results are as follows:

- Prior to the opening of the lane, travel time for all users of this segment of I-5 (from 99th Street to the south end of the Interstate Bridge) averaged **12.3** minutes during the peak hour from 7 a.m. to 8 a.m.
- After the opening of the lane, travel time for users in the general-purpose lanes averaged **14.3** minutes during the peak hour from 7 a.m. to 8 a.m.
- Travel time for users of the HOV lane averaged **8.4** minutes during the peak hour from 7 a.m. to 8 a.m.

Peak Hour (7 a.m. to 8 a.m.) Travel Time Results for HOV and General Purpose Users
99th Street to Interstate Bridge (Table 9 in Evaluation Report #1)

I-5 Segment	Baseline Travel Time – All Users	Travel Time After HOV Opening		Travel Time Change from Baseline		HOV Travel Time compared to GP Lanes*
		General Purpose Lanes	HOV Lane	General Purpose Lanes	HOV Lane	
99th Street to SR-500	5.0	4.6	3.3	-0.4	-1.7	-1.3
SR-500 to Mill Plain	2.4	4.1	1.2	+1.7	-1.2	-2.9
Mill Plain to Interstate Bridge (south end)	4.9	5.6	3.9	+0.7	-1.0	-1.7
TOTAL	***12.3***	***14.3***	***8.4***	***+2.0***	***-3.9***	***-5.9***

Travel time runs over at least three different days in September 2001 and November-December 2001
*A negative number indicates the HOV lane is saving time compared to the GP lanes.

Although travel time data collected during the peak hour more closely reflects comments received from morning commuters, WSDOT further explored the discrepancy. Post-opening travel time data was collected over four days rather than the three days necessary for the representational sample. Results from the additional day of data collection in December are included in the post-opening travel time findings. In an effort to collect additional data, WSDOT service vehicles will record travel time data on a daily basis starting Monday, December 17, 2002.

Impact on Parallel Facilities

GOAL: To minimize impacts to other traffic in the corridor on parallel facilities.

- Prior to the opening of the lane, **29%** of southbound traffic during the morning peak period (6 a.m. to 9 a.m.) occurred on I-5, **61%** occurred I-205, and **10%** occurred on Highway 99 or Hazel Dell Avenue.
- After the opening of the HOV lane, **28%** of southbound traffic during the morning peak period (6 a.m. to 9 a.m.) occurred on I-5, **61%** occurred on I-205, and **11%** occurred on Highway 99 or Hazel Dell Avenue.

Facility Shares of Southbound Traffic (Table 10 in Evaluation Report #1)

Measure	I-5 Share (percent)	I-205 Share (percent)	Others Share* (percent)
Peak Period Baseline Share	29%	61%	10%
Peak Period Share, After HOV Opening	28%	61%	11%
Share Change, Baseline to This Report	-1%	0%	+1%

I-5 and "Others" Measured at 99th Street. I-205 Measured at Mill Plain Boulevard.
"Others" include Highway 99 and Hazel Dell Avenue.

WSDOT also collected information on two additional north-south routes to determine if the Vancouver HOV Lane was impacting parallel facilities. They included Lakeshore Avenue and Main Street.

- After the opening of the HOV lane, southbound traffic on Lakeshore Avenue during the peak period increased 17%.
- After the opening of the HOV lane, southbound traffic on Main Street during the peak period increased 42%. Please note that the I-5 southbound off-ramp to Main Street was closed in September when the baseline counts were taken – and reopened on October 27, 2001, two days prior to the opening of the I-5 Southbound HOV Lane.

Carpool Use

GOAL: To increase the use of carpools, vanpools and transit.

- Prior to the opening of the HOV lane, **1,634** persons used carpools, vanpools and transit on this segment of I-5.
- After the opening of the HOV lane, **3,311** persons used carpools, vanpools and transit on this segment of I-5. This total includes all persons using carpools, vanpools and transit regardless of which lane being used. Of that number, 2,227 were in the HOV lane.

Peak Period (6 a.m. to 9 a.m.) Persons in Carpools, Vanpools and Transit on I-5
(Table 13 in Evaluation Report #1)

Mode	Baseline Persons	After HOV Opening (November 2001)	
		All Through Lanes	HOV Lane Only
Carpools and Vanpools	1,079	2,647	1,563
Transit	555	664	664
TOTAL	1,634	3,311	2,227

Baseline is from September 2001
After HOV Opening is from November 2001

Safety

GOAL: To maintain safety by not increasing the accident and incident rate in the corridor during HOV lane operating periods.

Safety will be measured by collecting information from WSP on reported accidents before and after the HOV lane opening. Because there is a time lag between the time occurs and the time when the accident is recorded into the state's accident database. This time lag is at least several months; therefore, information based on **reported accidents are not included in this report**.

In addition to accident rates, incident rates will be used to evaluate the maintenance of safety as related to the opening of the Vancouver HOV Lane. Incidents are recorded on incident logs kept by both WSP and WSDOT.

- Prior to the opening of the HOV lane, WSP and WSDOT reported **13** incidents during the peak period (6 a.m. to 9 a.m.) in this segment of I-5 during the month of September.
- After the opening of the HOV lane, WSP and WSDOT reported **12** incidents during the peak period (6 a.m. to 9 a.m.) in this segment of I-5 from October 29, 2001 to November 16, 2001.

Baseline Peak Period (6 a.m. to 9 a.m.) Incident Management Callouts (Table 15 in Evaluation Report #1)

WSP Call-Outs	WSDOT Incident Response Vehicle Callouts
On Roadway Incidents 4 property damage collisions 3 blocking disabled vehicles 2 traffic hazard reports	*On Roadway Incidents* 1 property damage collisions
Off-Roadway Incidents 2 abandoned non-blocking vehicles 1 disabled non-blocking vehicle	*Off-Roadway Incidents* 0 Off-Roadway incidents

September 2001 data (I-5 SB 6 to 9 a.m.)

After HOV Opening Peak Period (6 a.m. to 9 a.m.) Incident Management Callouts (Table 16 in Evaluation Report #1)

WSP Call-Outs	WSDOT Incident Response Vehicle Callouts
On Roadway Incidents 5 property damage collisions 7 blocking disabled vehicles 0 traffic hazard reports	*On Roadway Incidents* 0 property damage collisions
Off-Roadway Incidents 0 abandoned non-blocking vehicles 0 disabled non-blocking vehicle	*Off-Roadway Incidents* 0 Off-Roadway incidents

October 29 - November 16, 2001 data (I-5 SB 6 to 9 a.m.)

Violation Rate

GOAL: To maintain the HOV lane's effectiveness at 15% violation rate or less.

- The violation rate for the Vancouver HOV Lane is **5%.**
- The violation rate was calculated using Vancouver HOV Lane vehicle occupancy counts.
- The national violation rate average is in the 10 – 15% range.
- The Oregon HOV lane has a violation rate of 10%, which is within the national guidelines.

Travel Time Reliability

GOAL: To maintain or improve HOV travel time reliability in the corridor by maintaining an average speed of 45 miles per hour or higher over the length of the lane.

- The HOV lane is maintaining an average speed of **61** mph over the length of the lane during the peak period form 6 a.m. to 9 a.m.
- The HOV lane is maintaining an average speed of **59** mph over the length of the lane during the peak hour from 7 a.m. to 8 a.m.

HOV Lane Travel Speeds (Table 20 in Evaluation Report #1)

Time	Average Speed (MPH)
Peak Period 6-9 AM	
99th Street to SR-500	62
SR-500 to Mill Plain	57
Average over Length of HOV Lane	***61***
Peak Hour 7-8 AM	
99th Street to SR-500	61
SR-500 to Mill Plain	55
Average over Length of HOV Lane	***59***

Measured from 99th Street to Mill Plain Boulevard
Travel Time Runs from November-December 2001

Public Opinion

GOAL: To maintain or improve public opinion as to the effectiveness of HOV lanes.

A baseline public opinion survey was conducted in September 2001, prior to the opening of the Vancouver HOV Lane. Approximately 202 households were surveyed with a margin of error of +/-6.89% at the 95% confidence level.

During the survey, participants were asked, "Would you say the WSDOT HOV lane is…an excellent idea, a good idea, a fair idea, or a poor idea?" Survey results are as follows:

- An excellent idea: 31%
- A good idea: 27%
- A fair idea: 15%
- A poor idea: 27%

In addition, two post-opening public opinion surveys will be conducted during the Vancouver HOV Lane test period. It is anticipated that the surveys will be conducted in April 2002 and October 2002. Additional information on survey methodology and the complete survey results is available in the *Community Perception Survey Benchmark Report*.